Energy Conversion and Management

an International Journal

Volume 30 1990

List of Contents and Author Index

Pergamon Press
Oxford New York
Beijing Frankfurt São Paulo Sydney Tokyo Toronto

ENERGY CONVERSION AND MANAGEMENT

an international journal

Editor-in-Chief

DR JESSE C. DENTON
P.O. Box 355, Belton, TX 76513, U.S.A.

Editorial Assistant and Software Editor

ELIZABETH DENTON

Editorial Board

Electrochemical processes:
DR JOHN O. M. BOCKRIS
Department of Chemistry
Texas A & M University
College Station, TX 77843
U.S.A.

Magnetohydrodynamics:
DR RICHARD J. ROSA
Mechanical Engineering Dept
Montana State University
Bozeman
MT 59715, U.S.A.

Management in energy conservation:
MR CRAIG B. SMITH
ANCO Engineers
1701 Colorado Avenue
Santa Monica, CA 90404
U.S.A.

Photovoltaics:
PROFESSOR JOSEPH J. LOFERSKI
Department of Engineering
Brown University
Providence
RI 02912, U.S.A.

Regional Editor

France and Southern Europe: PROFESSOR PIERRE AIGRAIN, Laboratoire de Physique, Ecole Normale Superiéure, 24 rue Lhomond, Paris V^{e}, France

Publishing Office: Pergamon Press plc, Journals Production Unit, Hennock Road, Marsh Barton, Exeter EX2 8NE, England
(*Tel.* Exeter (0392) 51558; *Fax* 425370)

Subscription and Advertising Offices

North America: Pergamon Press Inc., Fairview Park, Elmsford, NY 10523, U.S.A.
Rest of the World: Pergamon Press plc, Headington Hill Hall, Oxford OX3 0BW, England
(*Tel.* Oxford (0865) 64881)

Annual Subscription Rates for 1990 (including postage and insurance)

Annual institutional subscription rate (1990) DM 710.00; 2-year institutional rate (1990/91) DM 1349.00; personal subscription rate for those whose library subscribes at the regular rate (1990) DM 139.00. Prices are subject to amendment without notice.

Published quarterly

Back Issues

Back issues of all previously published volumes, in both hard copy and in microform are available direct from Pergamon Press offices.

Copyright © 1990 Pergamon Press plc

It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript the authors agree that the copyright for their article is transferred to the publisher, if and when the article is accepted for publication. However, assignment of copyright is not required from authors who work for organizations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproduction of similar nature, and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

Photocopying information for users in the U.S.A.: The Item-fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying, beyond that permitted by Section 107 or 108 of the U.S. Copyright Law, is paid. The appropriate remittance of $3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970, U.S.A.

Permission for other use: The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works or for resale. Specific written permission must be obtained from the publisher for such copying. *The Item-fee Code for this publication is:* 0196-8904/90 $3.00 + 0.00

♾™The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

CONTENTS OF VOLUME 30

Number 1

V. K. Sharma, Sanjay Sharma, R. B. Mahajan and H. P. Garg	1	Evaluation of a matrix solar air heater
N. M. Nahar	9	Performance and testing of an improved hot box solar cooker
E. Taşdemiroğlu	17	Operation of a multistory solar building under adverse climatic conditions
A. Chakraverty and S. K. Das	29	Performance of an integrated array of solar collector modules for different air flow rates and flow organizations
Ram Chandra, N. P. Singh and M. S. Sodha	41	Thermal performance of a triple-pass solar air collector
N. Chaturvedi	49	A study of polarization in MHD power generator
H. Matsubara, S. Kabashima, H. Yamasaki and S. Shioda	55	Design of helium-driven MHD disk generators with high performance
Software Survey Section	I	

Number 2

S. O. Enibe and A. O. Odukwe	69	Patterns of energy consumption in Nigeria
Sanjay Sharma, V. K. Sharma, Ranjana Jha and R. A. Ray	75	Evaluation of the performance of a cabinet type solar dryer
Ashok Kumar and G. N. Tiwari	81	Use of waste hot water in double slope solar still through heat exchanger
S. O. Onyegegbu	91	Solar radiation induced natural convection in stagnant water layers
Basil F. Ali	101	Theoretical study of main factors affecting the heliostat field design of tower power plant
S. Subramanyam, A. V. Narasimha Rao and T. L. Sitharama Rao	107	Strip element mirror boosters for solar devices
J. Prakash, H. P. Garg and Ratna Verma	115	Transient analysis of a N-collector array under different configurations
Surendra Singh, M. P. Singh and Rupa Bakhshi	121	Unit energy consumption for paddy–wheat rotation

N. D. KAUSHIKA, R. A. RAY and PADMA PRIYA	127	A honeycomb solar collector and storage system
N. K. DHIMAN and G. N. TIWARI	135	Analysis of an underground solar water heater
U. STÖHRER, R. VOGGESBERGER, G. WAGNER and U. BIRKHOLZ	143	Sintered $FeSi_2$ for thermoelectric power generation
S. N. RAI, D. K. DUTT and G. N. TIWARI	149	Some experimental studies of a single basin solar still
G. M. SINGH and S. S. BHATTI	155	Statistical comparison of global and diffuse solar radiation correlations
M. HUSSAIN	163	Improved station-independent correlations between global radiation and sunshine duration
M. HUSSAIN	173	Improved station-independent correlations between diffuse irradiation and sunshine duration
V. BĂDESCU	179	The dependence of solar air heater performance upon tilt and orientation
VINOD KRISHNA and P. B. SHARMA	187	A study of transients in turbine heat rate of a thermal power plant
Corrigendum	203	
Software Survey Section	I	

Number 3

S. A. LAWRENCE and G. N. TIWARI	205	Theoretical evaluation of solar distillation under natural circulation with heat exchanger
C. E. OKEKE and A. C. ANUFOROM	215	Effect of clearness index on the optimum efficiency of an array of silicon solar cells
MOHAMMED M. FARID and RAFAH M. HUSIAN	219	An electrical storage heater using the phase-change method of heat storage
ASHOK KUMAR BHARGAVA, RANJANA JHA and H. P. GARG	231	Analysis of a solar air heater with thermosyphon flow in one channel and forced flow in other channel
M. FELS, D. F. COOPER and M. N. PATTERSON	235	An analysis of wood-burning installations from an environmental aspect
N. K. DHIMAN and G. N. TIWARI	245	Effect of water flowing over the glass cover of a multi-wick solar still
S. K. DAS and A. CHAKRAVERTY	251	Annual performance of integrated collector modules at a suitable tilt for air heating system
CHIH WU	261	Power performance of a cascade endoreversible cycle

V. R. MALGHAN — 267 — Prospects of early commercialization of MHD power plants

S. A. LAWRENCE, S. P. GUPTA and G. N. TIWARI — 277 — Effect of heat capacity on the performance of solar still with water flow over the glass cover

M. F. M. FAHMY and M. ABDEL-SADEK — 287 — On the dynamic behavior of hot water systems with tanks in series

A. J. SONDRUP and R. F. BOEHM — 297 — Evaluation of magma energy power generation systems

M. A. I. EL-SHAARAWI and M. A. AL-NIMR — 315 — Equations for use with computers to evaluate the performance of NH_3–H_2O intermittent solar refrigerators

Software Survey Section — I

Number 4

ASHOK KUMAR BHARGAVA and GIUSEPPE RIZZI — 329 — A solar air heater with variable flow passage width

S. A. LAWRENCE, A. POLE and G. N. TIWARI — 333 — Performance of a solar crop dryer under PNG climatic conditions

M. F. M. FAHMY and M. ABD-EL SADEK — 343 — Transient analysis of closed loop solar water heating system (effect of heat exchangers)

SHOU-SHING HSIEH and DER-CHI HUANG — 357 — Comparisons of thermal performance and pressure drop of counterflow and parallel-flow heat-pipe heat exchangers with aligned/staggered tube rows

MANOHAR PRASAD and K. S. CHANDRA — 369 — Optimum tilt of solar collector for maximum natural flow

H. PASTERNAK, I. SEGAL and HAVA ENGEL — 381 — Economic evaluation of energy conservation projects with an emphasis on initiation time

A. K. VIJ, SUSHIL and PREM VRAT — 387 — Energy policy implications of waste management in various sectors of the economy—an analysis based on physical systems theory

C. I. EZEKWE — 403 — Performance of a heat pipe assisted night sky radiative cooler

S. K. SHARMA, B. P. S. SETHI and SUNEETA CHOPRA — 409 — Thermal performance of the "Rohini"—an improved wood cookstove

M. SANTAMOURIS, D. PAPAIOANNOU, A. ARGIRIOU and G. STAVRAKAKIS — 421 — Technical and economical comparison between solar water heaters using electrodeposited chrome selective coating and selective paints

H. M. ALI, S. MOUSTAFA and H. EL-MANSY — 433 — An efficient greenhouse design for hot climates

FIROZ AHMAD, S. M. AQIL BURNEY and S. A. HUSAIN 439 Diffuse solar radiation estimates from sunshine hours and clearness index for Karachi, Pakistan

M. VAXMAN, M. SOKOLOV and M. SHCOLNICK 449 The dependence of thermosyphonic system performance on collector aspect ratio

Software Survey Section I